

# *Lower Missouri River Ecosystem*

## Ecosystem Description and Team Mission



USFWS photo

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- Lower Missouri River  
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The Missouri River is the nation's longest river, flowing 2,250 miles through seven states from the Rocky Mountains to the Mississippi, and draining one-sixth of the land mass of the contiguous United States. The Lower Missouri River Ecosystem managed by Region 3 includes parts of Minnesota, Iowa and Missouri.

The Lower Missouri River Ecosystem has experienced huge reductions in aquatic and wetland habitats and concurrent declines in fish and wildlife populations as the river valley was settled and developed. Direct losses of over 100,000 acres of aquatic and 400,000 acres of terrestrial habitats have occurred in the last century. The river has been shortened 127 shoreline miles by channelization and most of the diverse habitats in the active erosion zone have been converted to privately owned agricultural lands through accretion and bank stabilization. Over 90 percent of the floodplain forests, wetland and prairie have been converted to agricultural lands. Hydrology has been drastically altered and the River isolated from its floodplain through construction of levees and flood control structures. Fish, wildlife, riverine and other outdoor public use recreational opportunities have also declined dramatically.

The 811 miles of the lower Missouri River provide habitat for seven federally listed threatened and endangered species, two candidate species and seven other declining species of concern. Refuge lands and waters will be important to recovery of native species and their habitats while expanding public lands and opportunities for public use and enjoyment of Missouri River natural resources.

The Big Muddy National Fish and Wildlife Refuge was established in September 1994, with approval to acquire up to 60,000 acres of Missouri River floodplain lands. The refuge emphasizes fisheries and aquatic habitat conservation and restoration. Land acquisition and subsequent restoration will benefit a diversity of fish and wildlife resources including native river fishes, waterfowl, shorebirds, furbearers and passerine birds.

Restoration and management plans will be developed and implemented as floodplain lands are added to the Refuge. Refuge objectives include increasing connectivity of the river to its floodplain through periodic overbank inundation to capture resource benefits of the “flood pulse” while utilizing natural processes of erosion and deposition to create and maintain habitat diversity. Some more intensive management efforts will supplement natural processes to accomplish restoration of chutes, sloughs, backwaters, sandbar/braided channel complexes, bottomland forests, wet prairie grasslands and seasonal and permanent wetlands.

Restoration of back water habitats will enhance and restore fish habitat lost during river channelization and dam construction. Fisheries population assessment on the Big Muddy Refuge is one of the primary responsibilities of the Columbia Fisheries Resources Office. Assessments conducted throughout the Corps water control construction projects will provide the data needed for Columbia FRO to provide recommendations to Refuge, Ecological Services and Corps staff on project designs. Columbia FRO also works in conjunction with state fish and game agencies to assess the status and distribution of candidate and listed threatened and endangered species on the Missouri River.

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Acquisition and restoration of the Lower Missouri River Ecosystem is affected in a variety of ways by the operation maintenance of two Corps of Engineers’ projects – the Missouri River Mainstem Reservoir System, and the Bank Stabilization and Navigation Project. Ecological Service’s Habitat Conservation program provides the focal point for coordination with the Corps on many issues relevant to protection and restoration of the Refuge and the conservation of candidate and listed threatened and endangered species on the River. Ecological Services, working in partnership with Fishery Resource and Refuge staff, represents the Service’s interests and needs with regard to construction and maintenance of navigation training structures, annual operating plans and long term operating rules for the mainstem reservoir, implementation of the Corps’ own habitat restoration program, the Missouri River Mitigation Project, and consultation on the effects of these Corps activities on federally-listed threatened and endangered species.

The Missouri Resource Assessment Partnership was established in 1996 to help develop and deliver high quality information at the lowest possible cost so partner agencies can efficiently balance development needs with conservation needs. The Partnership consists of numerous state and federal conservation agencies and is led by the Missouri Department of Conservation.

The Missouri River Environmental Assessment Program was established in 1996 to provide the scientific basis for management strategies and decisions relating to the operation and maintenance of the Missouri River mainstem and floodplain. It is establishing a system-wide database on Missouri River water quality, habitat, and biota, and define the baseline environmental condition of the river. The two main parts of the program are long-term monitoring and focused investigations.

The Lower Missouri River Ecosystem Team and its partners will strive to restore habitat diversity on the Missouri River floodplain for the benefit of fish, wildlife and people. Accomplishing its mission will require the Team to restore and maintain the natural structure and function of the Lower Missouri River Ecosystem to the maximum extent possible through a balance of socioeconomic and natural resource uses arrived at by coordination and partnerships

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- Mission of the Lower  
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The Lower Missouri River Ecosystem team consists of three national wildlife refuges, The Columbia Field Office (Ecological Services), The Columbia Fishery Resources Office, and one law enforcement office. The work of the team, as well as its successes, are accomplished through partnerships with other federal, state and non-governmental agencies. These partners include:

- Missouri Department of Conservation (MDC)
  - U.S. Army Corps of Engineers (Missouri River Division, Kansas City and Omaha Districts)
  - Missouri Department of Natural Resources (MDNR)
  - U.S. Environmental Protection Agency (EPA)
  - USDA-Natural Resources Conservation Service (NRCS)
  - U.S. Geological Survey, Biological Resources Division (USGS-BRD) Columbia Environmental Research Center (CERC)
  - Ozark National Scenic Riverway
  - National Park Service (NPS)
  - Mark Twain National Forest (MTNF)
  - University of Missouri (UM)
  - Missouri River Natural Resources Committee
  - Missouri Department of Transportation (MoDOT)
  - Missouri River Basin Association
  - Other non-governmental organizations including the Environmental Defense Fund, The Nature Conservancy, The Fish and Wildlife Foundation, American Rivers, Sierra Club, Missouri Coalition for the Environment and Missouri River Communities Network support and advocate Missouri River Restoration.
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## Summary of Fiscal Year 1998 Accomplishments

### Indiana Bat, Scaleshell Mussel and Habitat Restoration

- Prepared final listing rules for scaleshell mussel and proposed rules for flathead chub.
- Continued revision of the Indiana Bat Recovery Plan.
- In cooperation with MDC continued the expansion of stream habitat restoration on private lands for the Niangua darter and Topeka shiner through the Partners for Fish and Wildlife program.
- In cooperation with MDC, restore wetlands and native prairies , and benefit federal candidate and listed species on private lands.
- Coordinated with NRCS in development and delivery of CRP, WRP, EQIP, WHIP, swampbuster and other farm programs affecting fish and wildlife.
- Coordinate with the Corps the continued effort to identify and mitigate the effects on fish and wildlife operation and maintenance of the Missouri River reservoir system and BSNP.
- Work with Refuges to address habitat issues and concerns.
- Worked with EPA, NRCS, Corps, MDC and MDNR to ensure rigorous review and habitat conservation efforts of wetlands through the proposed Ag. MOA.
- Coordinated with the Federal Highway Administration on the extensive 15-year Missouri plan through the NEPA process to minimize effects on fish and wildlife.
- Provided continued technical assistance to the Corps regulatory program to mitigate the effects of regulated activities on fish and wildlife. Worked with Corps, MDNR, MDC, and EPA to develop regional conditions for nationwide permits.
- Worked with MDNR, MDC, NRCS and the Corps to develop mitigation banks for Corps permit activities and NRCS minimal effect projects

## Paddlefish, Sturgeon and Chub Research

### ***Columbia Fishery Resources Office assisted the Missouri Department of Conservation in a cooperative effort to tag 47,749 paddlefish at Blind Pony Hatchery. - Fiscal Year 1998 Accomplishment***

■ Columbia Fishery Resources Office analyzed paddlefish catch data from the 22 state agencies participating in the MICRA coded-wire tag project. Approximately 3000 wild paddlefish and 276,000 hatchery-raised fish have been tagged in the Missouri River Basin. Columbia Fishery Resources Office produced the annual report in conjunction with the Cartersville Fishery Resource Office.

■ Columbia Fishery Resources Office manages the MICRA Missouri River Pallid Sturgeon Project database. Columbia Fishery Resources Office is also responsible for sampling target sites between Kansas City and St. Louis in early spring 1999. Other Missouri River sampling sites are targeted by Nebraska Game and Fish Commission, Iowa Department of Natural Resources, and Kansas. In the 1562 hours of net effort to date on the Missouri River 1050 fish have been collected. None were pallid sturgeon.

■ Columbia Fishery Resources Office assisted the Missouri Department of Conservation in a cooperative effort to tag 47,749 paddlefish at Blind Pony Hatchery. Fish were stocked in three reservoirs, Lake of the Ozarks, Truman, and Table Rock, and the Black River.

■ Columbia Fishery Resource Office monitored fish populations in the Lisbon Bottoms Unit of the Big Muddy National Fish and Wildlife Refuge. Fish samples were collected bimonthly to determine habitat use and effects of Corps water control structure development. Cooperating partners include: 1) the Ecogeography branch of the USGS-BRD Columbia Environmental Research Center (CERC) which conducts bathymetric surveys in conjunction with fish sampling, 2) the Ecology branch of CERC which collects and analyzes benthic invertebrates collected in Columbia Fishery Resources Office's benthic trawl samples, and 3) the Fisheries Techniques class at the University of Missouri which sends undergraduate students along to shadow fisheries professionals and learn about river work.

■ Columbia Fishery Resources Office collected exotic carp data from fish biologists within the Missouri River basin. The fish species of interest include bighead carp, silver carp, grass carp, and black carp. This data is being compiled to produce a distribution map of carp invasions within the river and its tributaries. Columbia Fishery Resources Office is also working in conjunction with Kansas State University on a proposal to examine bighead carp impacts on the Missouri River.

■ Columbia Fishery Resources Office completed a research report on the status and distribution of the flathead chub, sicklefin chub, sturgeon chub, plains minnow, and western silvery minnow in the Missouri River. The probability of collecting the flathead chub declined in the Missouri River dramatically after dam construction.

- Columbia Fishery Resources Office staff served as the Region3 ex-officio Missouri River Natural Resource Committee (MRNRC) and Committee Fish Technical section delegate. Served as an active participant in Missouri River Mitigation Project, Missouri River Master Manual Review, Missouri River Environmental Assessment Program development, pallid sturgeon recovery, and interjurisdictional fish management issues.

## Increasing and Restoring Habitat

- The 1993 and 1995 floods resulted in significant real estate acquisitions along the Missouri River. The Refuge continued its efforts with federal and state partners to acquire and enhance floodplain and aquatic habitat on the Missouri River. The goal of the Refuge is to acquire 60,000 acres of Missouri River floodplain between Kansas City and St. Louis.

- Refuge staff continued their effort to acquire land from willing sellers on the Missouri River floodplain. Approximately 1,600 acres of land were acquired in Fiscal Year 1998, increasing the size of the Refuge to 5,700 acres. The Refuge continues to manage 1,300 acres of Corps mitigation land at Overton Bottoms.

- NRCS, one of the Service's partners on the Missouri River, continued to acquire permanent easements on floodplain cropland through the Emergency Wetland Reserve Program. Another partner, Missouri Department of Conservation, continued to acquire fee title to Missouri River floodplain land. To date, the Corps has acquired 19,330 acres of aquatic and terrestrial habitat as part of their mitigation requirements for their Bank Stabilization and Navigation Fish and Wildlife Mitigation Project. Representatives of the four agencies have set up a work group to coordinate activities with the objective of helping each other to achieve program objectives, rather than compete with each other.

- The Refuge, together with the Corps and the Missouri Department of Conservation, continue to restore wetland and aquatic habitat at Lisbon Bottoms and Overton Bottoms.

- Swan Lake National Wildlife Refuge received over 60 inches of precipitation in 1998 which is well above the norm of 36 inches. Therefore, refuge operations were hampered due to flooding during the majority of the year. In addition to normal operation and maintenance of refuge functions, minor repair work was required to fix flood-damaged water control structures and levee roads.

- Swan Lake Refuge continued to restore and manage FMHA easement and fee title tracts.

- Squaw Creek National Wildlife Refuge repaired water detention dams and improved the riparian corridor in Davis Creek, a major tributary to the refuge. The restoration work was carried out with the Holt County Soil and Water Conservation District (HCSWCD) and NRCS.

- Along with the HCSWCD and NRCS, the refuge is in the early planning stages of preparing a Comprehensive Conservation Plan that will address water quality and sedimentation problems of all watersheds that drain into the refuge.
- Squaw Creek Refuge added 172 acres to its lands.
- Squaw Creek Refuge Staff continue to restore and manage 1,500 acres of easement land and 900 acres of fee title land.
- The eastern massasauga research program was completed and provided valuable information on determine seasonal movements and population dynamics for the snake.
- Squaw Creek Refuge continued its outreach program by promoting Refuge happenings on 12 movie screens in St. Joseph, Missouri. An estimated 250,000 viewed the promotion.
- At the peak of migration, approximately 430,000 snow geese migrated through the refuge. Approximately 200 bald eagles over-winter at the refuge.

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***The team will develop a variety of exhibits  
emphasizing the natural resources that the  
Lewis and Clark expedition encountered  
while on their journey.***

***- Fiscal Year 1999  
Ecosystem Team  
Goal***

## Goals for Fiscal Year 1999

The Lower Missouri River Ecosystem proposes to schedule the official dedication of the Big Muddy National Fish and Wildlife Refuge by Secretary of Interior Bruce Babbitt during the summer of 1999. The plan would be to have the dedication ceremony in or near the Lisbon Bottoms chute area. The chute is a unique area as it is the only self-restored side channel on the entire lower Missouri River. It is also the site of partnership and cooperation with the Corps who is constructing water control structures to limit the amount of water entering the chute. The Corps wants to maintain the majority of flow to the main channel for navigation purposes. The dedication ceremony may also include sampling fish from the river and chute, a luncheon or picnic at a state historical site that overlooks Lisbon Bottoms, a boat ride on the river in and around the refuge and/or a helicopter ride. Our Missouri River partners, Corps, MDC, MDNR, EPA, and NRCS would also be invited to participate in the dedication.

The Lower Missouri River Ecosystem team also recognizes the significance of the Lewis and Clark expedition on the Missouri River which occurred from 1802-1804. There are already many efforts being planned by state and federal agencies to acknowledge the significance of that journey. The team believes Fiscal Year 1999 is a good time to begin organizing our planned involvement to promote the importance of fish and wildlife resources and the recreational benefits of the Missouri River. A major emphasis will be to continue the program to acquire and restore floodplain land for the BIG MUDDY NATIONAL FISH AND WILDLIFE REFUGE. The team will develop a variety of exhibits emphasizing the natural resources that the expedition encountered while on their journey. The exhibits will also show today's resources on the floodplain and how the Service is working to provide more recreational activities for the public. The present day Lewis and Clark awareness should include inviting Secretary Babbitt and Director Clark to the lower Missouri River. The Lower Missouri River Ecosystem team could demonstrate the joint effort to restore sections (beads) of the floodplain for fish and wildlife purposes. Our partners, MDC, MDNR, Corps and the EPA should be involved in the planning process.

## Niangua Darter and Topeka Shiner

- Continue ongoing activities from Fiscal Year 1998 (listed above).
- Prepare for an extended consultation, with jeopardy opinion likely with the Corps on the Missouri River Bank Stabilization and Navigation Project and the Missouri River Master Manual Current Operation Procedures.
- It is anticipated that three-five new wetland mitigation banks will be proposed to provide compensatory mitigation for the Corps' Section 404 of the Clean Water Act permits.
- In cooperation with Missouri Department of Conservation, Ecological Services will continue to expand stream habitat restorations on private lands for the Niangua darter. In Fiscal Year 1999, the stream habitat restoration program on private lands will include the Topeka shiner.



- Complete the listing designation for the Topeka shiner as a federally-listed endangered species.

## **Paddlefish and Sturgeon**

- Columbia Fishery Resources Office will continue to perform activities listed above from Fiscal Year 1998.
- Columbia Fishery Resources Office will assess fish stocks within the oxbow lake at Desoto Bend NWR.
- Columbia Fishery Resources Office will begin construction of an interactive GIS component to the MICRA paddlefish coded wire tag project.
- Columbia Fishery Resources Office will assist MDC with tagging and stocking pallid sturgeon raised at Blind Pony Hatchery.

## **Repair Levees**

- Weather permitting, Swan Lake Refuge will continue to make repairs to refuge levees and water control structures damaged by 1998 floods.
- Address continued flooding on yellow creek that causes serious damages to the refuge.
- Outside of its normal operations, Squaw Creek Refuge will prioritize work with Holt County Soil and Water Conservation District and NRCS on the Comprehensive Conservation Plan for Holt County watersheds. Improving conditions of water quality and riparian habitat will ultimately improve the same conditions in the Refuge and the Missouri River.
- Will pursue the approved Preliminary Project Proposal to add 17,000 acres of land in fee title and 55,000 acres of land in easement to the refuge. Most of the proposed land is upland but is essential to protect and enhance refuge operation by improving water quality and reducing heavy sediment loads from the loess hills.

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***- Fiscal Year 1999  
Swan Lake Refuge  
Goal***

## Lower Missouri River Ecosystem Fiscal Year 1998 Accomplishments

### **Refuge Week Float Tops at Holt County Fall Festival**

#### *Squaw Creek National Wildlife Refuge*

As part of its National Wildlife Refuge Week activities, Squaw Creek Refuge entered a float in the Holt County, Mo., Fall Festival Parade. The float depicted a wetland scene and featured Refuge volunteers clad in sandwich signs that gave various facts about the Refuge and the Service's refuge system. They also passed out stickers, blue goose tatoos, bookmarks, and a listing of national wildlife refuge activities to be held at Squaw Creek. The Service message reached approximately 3,000 people, and the Refuge float won first place. In other Refuge Week activities, volunteer George Scheil presented a slide show on monarch butterflies to capacity crowds; two bus tours were given to approximately 50 people, and an art contest for 150 Mound City elementary students was held. Nine awards were given for the contest including savings bonds, and other merchandise from Mound City merchants. All prizes were donated by local businesses. **10/97**

### **Bait, Lures, Waterfowl, and Agents!**

#### *St. Peters Law Enforcement Office*

A weekend waterfowl enforcement task force in Missouri uncovered two baiting areas and the apprehension of two hunters hunting in them. A total of nine violators were cited. Violations included nine violations of hunting over bait; three violations of hunting with an invalid migratory bird hunting and conservation stamp; and two violations of possessing lead shot. **10/97**

### **DeSoto Marks National Wildlife Refuge Week**

#### *DeSoto National Wildlife Refuge*

More than 4,605 people visiting DeSoto National Wildlife Refuge during National Wildlife Refuge Week celebrations. In addition to distributing bookmarks, posters, Service brochures, and DeSoto's own "celebrate" flyer; the refuge offered free admission from October 11-13. Several videos were shown. The refuge also hosted a wildlife art show and sale featuring 28 artists. **10/97**

### **State Representatives, Congressmen Briefed On Big Muddy Expansion Proposal**

#### *Big Muddy National Fish and Wildlife Refuge*

Refuge staff briefed the Missouri Congressional delegation on the draft Environmental Impact Statement for the Big Muddy National Fish and Wildlife Refuge. Missouri state lawmakers were also briefed. Most lawmakers and staff seemed familiar with the project and appreciated the information. **10/97**

### **Missouri River Anglers Aid Paddlefish Research**

#### *LaCrosse Fishery Resources Office*

The Missouri River paddlefish season in South Dakota and Nebraska is providing an excellent opportunity to continue development of non-lethal sampling methods being developed by the Service and University of Wisconsin School of Veterinary Medicine and the University of California Moss Landing Marine Laboratory. The paddlefish has long been a state-listed threatened species in both Minnesota and Wisconsin where it is protected. However, the current status of paddlefish populations in these states is largely unknown because biological data is not routinely gathered for this non-game species. A portion of this deficiency exists because biologists have typically relied on invasive, (and often lethal) sampling techniques to determine characteristics such as paddlefish gender and age. The LaCrosse Fishery Resources Office is evaluating alternative methods to determine paddlefish gender and age, respectively, by invasive means that will insure the well-being and survival of individual fish. These non-lethal methods include ultrasound-guided biopsy of gonadal tissue for histological determination of sex and biopsy of dentary bone for radiometric determination of age. In order to increase the accuracy and precision of this new sexing method, many paddlefish of various sizes need to be examined. Validation of the new aging method also required sacrificing several fish to compare the radioisotope composition of dentary bone and otoliths. **10/97**

## **Photography Contest at Mingo National Wildlife Refuge**

### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge hosted a photography contest to promote the public use of nature photography. One rule of the contest was that all photos must have been taken on Mingo Refuge. Some of the photos will be featured in the updated Mingo National Wildlife Refuge general informational brochure that is currently being developed. **10/97**

## **Bird Feeders Donated to Refuge Following Woodworking Contest at Mingo**

### *Mingo National Wildlife Refuge*

Area woodworkers entered homemade bird feeders in a contest hosted by Mingo National Wildlife Refuge. Participants were told that feeders donated to the refuge to be used in the newly remodeled songbird feeding area. This was a good opportunity to promote songbird conservation while the refuge acquired many unique hand-carved feeders. All but one participant chose to donate their feeder to the refuge. **10/97**

## **High School Poster Contest Hosted by Mingo Refuge**

### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge hosted a poster contest for area junior and senior high school art students. The contest's theme was "Our National Wildlife Refuge System." Art students developed their posters from the Mission Statement of the national wildlife refuges. Each participant received a National Wildlife Refuge Week poster and the winning entries were displayed during the Refuge open house. **10/97**

## **Society for Rangeland Conservation Tours DeSoto Refuge**

### *DeSoto National Wildlife Refuge*

Members from the Society for Rangeland Conservation toured the visitor center museum and refuge. Refuge staff discussed the refuge's sustainable agriculture program, grassland program, wildlife programs, wetland management, controlling invasive plant pests, how the Missouri River Valley hydrology has changed and environmental effects, and different types of research conducted at the refuge. **10/97**

## **Mingo Volunteers Team With Girl Scouts**

### *Mingo National Wildlife Refuge*

Volunteers and staff at Mingo National Wildlife Refuge are assisting local Girl Scouts by providing facilities, coloring books, and photocopying for Scout activities. Refuge Volunteer Christine Hansen and Terry Peacock, assistant manager, also serve as Girl Scout Troop Leaders. In exchange, Girl Scout Troops are taught environmental education and ecological principals as they relate to life in southeastern Missouri.

## **Mingo National Wildlife Refuge Participates in "Industrial Day"**

### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge took part in the annual "Southeast Missouri (SEMO) Industrial Day," a special event that brings SEMO businesses and government entities together with local elected officials to promote and attract business to southeast Missouri. A display area was constructed and information made available to the public. Mingo National Wildlife Refuge was a main attraction to the event because of its 120,000-160,000 annual visits. **10/97**

## **Missouri Hunters Caught With Too Many Geese**

### *Jefferson City Law Enforcement Office*

On October 26, 1997, a Missouri Conservation Officer gave information about a hunting club he believed to be taking over limits of waterfowl. Covert investigations documented the over limits. Law enforcement officers later contacted four members of the club and seized 61 Canada geese. The possession limit of Canada geese is four geese per person or 16 geese for the four members. The season had been open for three days for Canada geese in the Swan Lake Zone. To date, 11 defendants have been identified and will be charged for a total of 19 counts of Migratory Bird Treaty Act violations—take over limits, exceed the possession limit, etc. The defendants were members of Ducks Unlimited and were very cooperative during the investigation. Approximately 50 federal counts were identified that could be charged along with numerous State laws involving big and small game. **10/97**

### **Mingo Refuge Featured on Radio Talk Show**

#### *Mingo National Wildlife Refuge*

Rod Hansen, assistant manager at Mingo National Wildlife Refuge, was the featured guest on "Good Morning Poplar Bluff," a 30-minute talk show from a Poplar Bluff radio station. Topics discussed were the National Wildlife Refuge System, National Wildlife Refuge Week activities at Mingo, and the history and management of Mingo National Wildlife Refuge. **10/97**

### **Service Special Agent Gives Presentation on Bird Baiting Laws**

#### *St. Peters Law Enforcement Office*

Special Agent Dan Burleson gave a presentation about baiting to the Missouri Department of Conservation - Ozark Region. Burleson covered the Migratory Bird Treaty Act baiting regulations, penalties, documentation required of a baiting case, and the elements necessary to make a case. Burleson included examples, photos from previous baiting cases and answered questions from the protection division agents attending the training. **10/97**

### **New Interpretive Panel Installed on Auto Tour Route**

#### *DeSoto National Wildlife Refuge*

Refuge staff constructed a vehicle turnout and installed a new interpretive panel on the refuge auto tour route in late October, just in time for the busy November public use season. The panel, "Farming for the Future," explains how the biological farming program works, its benefits, and other aspects of the program. The panel and turnout were located so that several crop fields could be seen behind the exhibit, thus emphasizing the crop rotation aspects of the program. This display has the potential to reach thousands of visitors, some of which may use the information to encourage similar environmentally-friendly practices on non-refuge lands. **10/97**

### **"Make a Wish Foundation" Dream Realized at Mingo**

#### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge assisted a the Make a Wish Foundation's efforts to help a terminally ill youth realize his dream of going on a deer hunt. A special permit was issued to the youth to enter an area of the refuge normally closed to archery hunting. Cabela's, Inc. furnished hunting clothing and a bow. Although

a deer was not harvested, the boy enjoyed the opportunity and was very thankful for getting his wish granted. **10/97**

### **National Wildlife Refuge Week Open House**

#### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge celebrated National Wildlife Refuge Week with an open house Saturday, October 18. Several speakers presented different topics throughout the day including the national wildlife refuge system, wildlife law enforcement, a tree identification hike, Wildlife Rehabilitation Program and nature photography. Also on display were the winners of the poster contest, a bird feeder competition, and photography contest. **10/97**

### **"Owls & Howls" Night Hike**

#### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge held an "Owls & Howls" tour, a night hike on the Boardwalk Nature Trail on the refuge. Refuge staff began the program with a "Wings Over Mingo" discussion, followed by the night hike. **10/97**

### **Swan Lake National Wildlife Refuge has Conservation Day for Area School**

#### *Swan Lake National Wildlife Refuge*

Approximately 60 grade school children attended the Conservation Day at Swan Lake National Wildlife Refuge during National Wildlife Refuge Week. Wildlife Biologist Bridget Olson coordinated the event. The children from Tina-Avalon and Northwestern School Districts were given a brief overview of the refuge at the refuge visitor center, visited the observation tower, and made stops on the refuge to learn about prairie grasses, waterfowl identification, and refuge management. **10/97**

### **Chariton Co. Heritage Tours Visits Swan Lake National Wildlife Refuge**

#### *Swan Lake National Wildlife Refuge*

The Chariton County Heritage Tour Committee has arranged for tours to be given in Chariton County and the surrounding area. The first tour, which included approximately 40 tour guides from North Missouri, stopped at Swan Lake National Wildlife Refuge. Wildlife Biologist Bridget Olson explained the management of the refuge and briefed them about visiting waterfowl. The tour committee hopes that this initial tour generates many more tours through Chariton County, Swan Lake National Wildlife Refuge, and the surrounding communities. **10/97**

### **Region Briefs Lawmakers on Big Muddy Refuge, Environmental Impact Statement**

#### *Big Muddy National Wildlife and Fish Refuge*

Service representatives from Region 3, Big Muddy Refuge and Columbia Field Office visited Washington October 16 to brief Senate and Congressional staffs on Big Muddy National Fish and Wildlife Refuge and the upcoming Draft Environmental Statement. The Service Directorate was also briefed. The draft Environmental Impact Statement will be available to the public in November, with open houses scheduled Nov. 13-19 at Concordia, Kansas City, St. Charles, Columbia and Washington in Missouri. **10/97**

### **Service Programs Reach 44,000 at National Future Farmers of America Show**

#### *Squaw Creek National Wildlife Refuge*

Squaw Creek Refuge staff operated an information booth at the National Agricultural Career Show of the Future Farmers of America in Kansas City, Missouri, Nov. 12-14, 1998. Two staff members from Swan Lake National Wildlife Refuge also assisted. More than 44,000 show attendees were exposed to Refuge and Service programs during the three-days. **11/97**

### **November 97 Snow Goose Migration Numbers Well Below Average**

#### *Squaw Creek National Wildlife Refuge*

The numbers of migrating snow geese tracked at Squaw Creek refuge in November shows a drastic reduction over past years. A peak of only 20,000 were recorded this fall. Except for the record drought of 1988, this fall's migration reflected the lowest peak since the mid-1950's. Usual peak numbers are 300,000 to 400,000. **11/97**

### **DeSoto Refuge Hosts Best Deer, Worst Waterfowl Hunts**

#### *DeSoto National Wildlife Refuge*

DeSoto National Wildlife Refuge hosted two, three-day muzzleloader deer hunts for Nebraska residents. 187 hunters logged 3,651 hours to harvest 92 white-tailed deer, the second highest number ever recorded. The Refuge also hosted its 24<sup>th</sup> consecutive waterfowl hunt. Two hundred ninety-three hunters logged 1,365 hours to harvest 29 geese and 17 ducks. The worst season ever. **11/97**

### **"Big Sit" Held at Swan Lake National Wildlife Refuge**

#### *Swan Lake National Wildlife Refuge*

The Grand River Audubon Society held its annual "Big Sit" at Swan Lake National Wildlife Refuge on October 19, 1997. The "Big Sit" consists of drawing a 17-foot circle and seeing how many bird species can be spotted from this circle. Forty-four species were spotted along Swan Lake. Many visitors to Swan Lake also participated with the Audubon Society. **11/97**

### **Service, State Law Enforcement Agents Foil Ozark 'Deer Doggers'**

#### *Jefferson City Law Enforcement Office*

Service law enforcement agents assisted agents from the Missouri Department of Conservation (MDC) in patrolling National Forest land for hunters illegally harvesting white-tailed deer. The interagency task force was formed after the lives of Missouri Conservation Officers were threatened by local violators. True to local tradition in the southeast Ozarks, the local outlaws illegally use dogs to hunt deer. In 1996, a Missouri Conservation was assaulted and seriously injured by "deer doggers" in the Ozarks. This year the Ripley County Sheriff informed the MDC that the local outlaws had put the word out that if they were stopped by an Agent, the body would not be found this time. The MDC requested law enforcement assistance from the Service. Five Service special agents worked with the MDC during the deer season. No conservation agents were assaulted, and multiple arrests were made, including two for illegally hunting deer with the aid of dogs. Two hunters were also apprehended during the task force for hunting white-tailed deer on Mingo National Wildlife Refuge with rifles in a closed area. **11/97**

## **Open Houses Spur Comments Regarding Expansion of Big Muddy National Fish and Wildlife Refuge**

### *Big Muddy National Wildlife and Fish Refuge*

Open houses relative to the Draft Environmental Impact Statement for the expansion of the Big Muddy National Fish and Wildlife Refuge were conducted November 13-19, 1997. The meetings were held in Concordia, Mo., Nov.13 with approximately seven people attending; Kansas City on Nov.14 with 33 attending; St. Charles on Nov.17 with 19 attending; Columbia on November 18 with 43 attending and Washington on Nov.9 with 50 attendees. Strong opinions — both for and against the proposed expansion — were expressed at all meetings. There was concern from those attending both the Washington and Kansas City meetings that the project was somehow related to a plot by the United Nations to gain real property interest in the United States. Comments on the Draft Environmental Impact Statement continues until January 7, 1998. **11/97**

## **Mingo National Wildlife Refuge Hosts "Missouri and the Ice Age"**

### *Mingo National Wildlife Refuge*

Mingo National Wildlife Refuge and the Missouri Department of Conservation hosted "Missouri and the Ice Age," a teachers workshop concerning geological and cultural history of southeast Missouri. The workshop was a two-day, non-credit course held at the Refuge's visitor center. **11/97**

## **Missouri Road-Block Stymies Illegal Hunters**

### *St. Peters Law Enforcement Office*

Service special agents participated in a Madison County road block operated by Missouri Highway Patrol and the Missouri Department of Conservation. Forty-three violations were documented, including 12 involving waterfowl. The waterfowl violations included over-possession limits and transporting without species identification. Two hunters entered the road block with over 40 ducks. The maximum possession limit for them was 24. The two left the road block with no ducks. There were also numerous violations involving white-tailed deer. Possession of illegal drugs, alcohol, and vehicle registration violations were also documented. The majority of the violations were wildlife crimes. **11/97**

## **Volunteer Contributions Recognized at Squaw Creek**

### *Squaw Creek National Wildlife Refuge*

fifty-one volunteers staffed the office during eight weekends this fall. Approximately 3,758 visitors entered the office and were greeted by volunteers. Volunteers continue to make significant contributions to our program. Barbara Crouser, St. Joseph, Missouri, was named as the 1997 Volunteer of the Year at a recent volunteer recognition/Christmas party. Barbara was responsible for getting the Refuge adopted by the Midland Empire Audubon Society, has been active in recruiting volunteers, and has been the only person to attend all 19 workdays held over the past 10 years. **12/97**

## **Annual Eagle Days Draws 3,000 Visitors to Refuge**

### *Squaw Creek National Wildlife Refuge*

Nearly 3,000 people visited the refuge during the 19<sup>th</sup> annual Eagle Days at Squaw Creek Refuge Dec. 6-7, 1997. The two-day event is co-sponsored by the Missouri Department of Conservation. More than 5,000 people drove the auto tour route during the two-day event. **12/97**

## **Bertrand Museum Volunteer Awarded Volunteer of the Year**

### *DeSoto National Wildlife Refuge*

The five-member Freeman family was awarded the DeSoto National Wildlife Refuge "Volunteer of the Year" honors for 1997. The Freeman's logged more than 500 volunteer hours at the Refuge, nearly all of the hours were dedicated to the preservation of artifacts in the Bertrand Collection. **12/97**

## **Iowa's Historical Resource Development Workshop Held at DeSoto Refuge**

### *DeSoto National Wildlife Refuge*

The State Historical Society of Iowa held a one-day grant-writing workshop at DeSoto National Wildlife Refuge. Staff from 15 local museum and historical societies attended the workshop, which will help institutions acquire state monies for their museum programs. **12/97**

## **Low-Input Sustainable Farming at DeSoto National Wildlife Refuge**

### *DeSoto National Wildlife Refuge*

DeSoto National Wildlife Refuge successfully managed 2,181 acres of crop land under cooperative farming agreements with nine local farmers. Crops grown included corn, sorghum, soybeans, sweet clover, winter wheat, oats, and alfalfa. All but 121 acres were managed using low-input sustainable methods. These methods use sweet clover as the sole source of nitrogen for a following crop, limited herbicide use, no insecticide usage, and prescribed fall tillage. Crop land program public education reached 74 people, including 36 agriculturists from Russia and the Ukraine. A permanent "Farming for the Future" interpretive panel was install at a new turnout along the auto tour. **12/97**

## **Squaw Creek Slide Show Hits the Big Screen**

### *Squaw Creek National Wildlife Refuge*

Movie-goers in St. Joseph, Mo., were treated to some non-Hollywood educational entertainment prior to the start of feature films at a local theaters courtesy of Squaw Creek National Wildlife Refuge. Approximately 250,000 theater patrons viewed slides about Squaw Creek Refuge and National Wildlife Refuge Week from June through December 1997 before every movie in theaters (12 screens total). **12/97**

## **Wildlife Biologist Demonstrates Banding Techniques**

### *Swan Lake National Wildlife Refuge*

Wildlife Biologist Bridget Olson demonstrated banding techniques to approximately 17 members of the Grand River Audubon Society members. She explained how to band different species of ducks and Canada geese and how banding the birds helps in tracking the flight patters of the birds. Olson also gave a brief overview of her banding experience while on a six-week detail in Canada in the summer of 1997. **1/98**

## **Service Special Agent Assists At Import-Export Seminar**

### *St. Peters Law Enforcement Office*

Special Agent Leapley took part in a roundtable discussion at an importing/exporting seminar at the request of the U.S. Customs Service. The seminar took place at the World Trade Center in Clayton, Mo. Approximately 60 professionals from import/export businesses in the St. Louis area attended. **1/98**

## **Missouri Swan Shooter Apprehended**

### *St. Peters Law Enforcement Office*

After receiving a complaint of a swan being shot at a St. Charles, Mo., duck club, Service Special Agent Robert Leapley searched the club and found no evidence of the swan or hunters in the field. Special Agent Leapley later found three hunters cleaning quail at a caretaker's residence. Two hunters admitted to hunting goose earlier that day, and then one hunter showed Special Agent Leapley a trash can containing a dead tundra swan. The swan was seized and the hunter was subsequently issued a violation notice for federal court. **1/98**

## **Swan Lake National Wildlife Refuge Holds Managed Deer Hunts**

### *Swan Lake National Wildlife Refuge*

Swan Lake National Wildlife Refuge held three successful managed deer hunts in January 1998. The muzzleloading hunt for persons with disabilities was held the first weekend in January with eight participants. The hunters shot a total of ten deer and were later fed a delicious meal by the Mendon Lions Club. The same weekend a muzzleloader any-sex deer hunt was held on the east side of the refuge and managed by the Missouri Department of Conservation. Fifty-three deer were harvested by 73 participants. On January 17-18, 75 people participated in a muzzleloader doe hunt on the interior of the refuge. Seventy-five deer were harvested, 55 does, 19 button bucks and one buck. **1/98**

## **Poster Presented at Missouri Natural Resources Conference**

### *Columbia Fisheries Resource Office*

Joanne Grady and Jim Milligan, of the Columbia Fisheries Resource Office presented a poster of their 1997 Missouri River chub and minnow survey at the 1998 Missouri Natural Resources Conference. The survey confirms concerns regarding the decline of the flathead chub and Western silvery minnow. **2/98**

## **Improvements Made to DeSoto Refuge Visitor Center**

### *DeSoto National Wildlife Refuge*

Wilderness Graphics, Inc. installed the new information desk at the entrance to DeSoto Visitor Center March 4-7, 1998. This is part of a multi-year interpretive improvement project at the refuge. Three life-size dioramas to be installed include wetlands, woodlands, and grasslands scenes and animals. The size of the publication sales area was increased four-fold. **3/98**

## **Steamboat Bertrand Museum Loans Objects to Omaha Museum**

### *DeSoto National Wildlife Refuge*

The Steamboat Bertrand Museum temporarily loaned 28 objects to the Durham Western Heritage Museum in Omaha, Nebraska. Representing typical merchandise shipped to the Western frontier for resale and trade, the exhibit includes reconstructed shipping crates with stencil patterns found on the Bertrand cargo displayed with their contents such as bitters, ale, and pepper sauce bottles. Other loaned objects include an ax head, a door lock and key, candles, percussion caps, and a variety of buttons. **3/98**

## **Big Muddy Refuge Presented at Conference on Natural Resources**

### *Big Muddy National Wildlife and Fish Refuge*

A presentation on the Big Muddy National Fish and Wildlife Refuge was given at the Conference on Natural Resources of the Missouri River Basin. The meeting was attended by organizational and government representatives throughout the Basin. **3/98**

## **Big Muddy Manager Addresses Missouri State Legislature**

### *Big Muddy National Wildlife and Refuge*

Refuge Manager J.C. Bryant provided a presentation on the Big Muddy Refuge members of the Missouri Joint Subcommittee on Wetlands. The presentation covered the Big Muddy Refuge, and the Environmental Impact Statement under development for the proposed expansion of the refuge. The presentation was well received; the Big Muddy video was also shown. Several members complimented the video, and the subcommittee asked for an additional copy. Bryant was also asked by a "Boot Heel" Senator how they could increase funding to Mingo Job Corps. After the presentation, Bryant and Judy McClendon

visited with Rep. Richardson from Poplar Bluff on Refuge and Job Corps issues. **4/98**

## **Columbia Fishery Resource Office Hosts Visiting Missouri River Author**

### *Columbia Fishery Resources Office*

Environmental author Dr. Daniel Botkin toured the Big Muddy Refuge area and discussed Missouri River natural resource issues with Service staff during a spring visit to the Big Muddy National Wildlife and Fish Refuge. Dr. Botkin is a noted author, researcher, ecologist and President of The Center For The Study Of The Environment who is gathering background information for a new book, "The American Rivers Guidebook to The Travels of Lewis and Clark on: The Missouri River". Dr. Botkin seemed pleased with the Service's concept of restoring portions of riverine habitat using natural processes of erosion, deposition and succession to the greatest extent possible. **4/98**

## **Mingo Refuge Staff Participates in Annual Earth Days**

### *Mingo National Wildlife Refuge*

Refuge staff taught environmental education topics to Butler County eighth graders at the annual "Earth Days" activities sponsored by the U.S. Army Corps of Engineers at Wappappello Lake, Missouri. Refuge staff also taught conservation subjects to 500 Stoddard County, Mo., fifth graders during the county's Ecology Days. **4/98**

## **Survey Finds 23 Rare Eastern Massasauga Snakes**

### *Swan Lake National Wildlife Refuge*

The tall grass prairie tract on Swan Lake National Wildlife Refuge, long known to contain massasauga rattlesnakes, was formally surveyed on March 28, March 29, April 2, and April 6. The survey team, lead by Dr. Richard Seigel of Southeastern Louisiana, found 23 massasauga rattlesnakes during the 73-hour effort. The snakes captured were sexed, aged, weighed, and tagged. Dr. Seigel believes that the snakes at Swan Lake Refuge are probably only the second viable, reproducing population of this species in the state of Missouri and may be an important stronghold in the recovery of this state-listed endangered species. **5/98**



## **Columbia Office Monitoring Fish at Big Muddy Refuge**

### *Columbia Fishery Resources Office*

Columbia Fishery Resource Office conducted fish sampling in the waters of the Lisbon Bottoms Unit of the Big Muddy National Wildlife and Fish Refuge from May 18- 22, 1998. Lower Missouri River Ecosystem Partners from Missouri Department of Conservation and U.S. Geological Survey, assisted in fish and invertebrate sampling. Routine surveys are conducted to determine use of the unique self-restored river chute by interjurisdictional and candidate fish species. Routine surveying allows us to monitor changes in the fish community over time. This information assists the Refuge in negotiations with the U.S. Army Corps of Engineers regarding chute modifications. **5/98**

## **Swan Lake Hosts Fishing Clinic**

### *Swan Lake National Wildlife Refuge*

In conjunction with National Fishing Week, Swan Lake National Wildlife Refuge hosted a fishing clinic on June 2, 1998. Twenty-two local school children participated in activity stations such as knot tying, casting, fish cleaning, and a presentation on fish sampling. The rest of the afternoon the children practiced their fishing skills by fishing Silver Lake. Prizes were awarded. Though no fish were caught, each child went home with an activity packet complete with t-shirt. **6/98**

## **DeSoto National Wildlife Refuge Sponsors Fishing Clinic for Inner-City Youth**

### *DeSoto National Wildlife Refuge*

On June 6, 1998, DeSoto National Wildlife Refuge and the Nebraska State Layman's Association sponsored a fishing clinic in conjunction with National Fishing Week. Forty five inner-city youths and 12 adults participated. Instruction was provided for casting, identification, knot-tying, and safety. Fishing opportunities were provided on DeSoto Lake with a barbecue afterwards. Many of the young people have little or no opportunity to experience these types of activities. **6/98**

## **Wetland Conservation Award Presented to Iowa School for the Deaf**

### *DeSoto National Wildlife Refuge*

Nita Fuller, assistant regional director for Refuges and Wildlife, presented the Service's National Wetlands Conservation Award to the Iowa School for the Deaf in Council Bluffs,

Iowa. The June ceremony was held in conjunction with the dedication of the Nature Center complex and wetland demonstration site. **6/98**

## **Bible Campers Tour Swan Lake National Wildlife Refuge**

### *Swan Lake National Wildlife Refuge*

About 50 elementary school students visited Swan Lake National Wildlife Refuge June 29, 1998, as part of Immaculate Conception Catholic Church Bible Camp field trip. The Brookfield, Mo, group listened to a presentation by refuge staff on management activities and migratory birds of Swan Lake National Wildlife Refuge. The children then climbed the observation tower. **7/98**

## **Exhibits Renewed at DeSoto's Visitor Center**

### *DeSoto National Wildlife Refuge*

Wilderness Graphics Inc. of Tallahassee, Fla., installed new exhibits at the DeSoto Refuge visitor center August 12-28, 1998. The installation is part of a multi-year plan to renew exhibits, and stress the present mission of the Service. Highlights of the remodeling include: life size dioramas of the woodlands, grasslands and wetlands of the Missouri River Valley, repositioning the steamboat exhibits, relocating the information desk and expanding the sales area five-fold. **8/98**

## **Grassland Restorations Completed for 1998**

### *DeSoto National Wildlife Refuge*

DeSoto staff reverted 126.2 acres of former cropland at DeSoto and Boyer Chute National Wildlife Refuges to native grassland species. A mixture of native warm-season (100.2 acres) and cool-season (26.0 acres) grasses were planted. This was a little more than half of the planned acres. Wet weather prevented timely seedbed preparation and planting on 95 acres. Current plans are to dormant seed these acres this fall. **7/98**

### **Missouri Man Sentenced in Bald Eagle Death**

*Jefferson City Law Enforcement Office*

Brian K. Young, 36, of Lexington, Mo., was sentenced June 30, 1998, to one year in prison, the maximum sentence under federal law, for killing a bald eagle on Nov. 15, 1995. Young admitted shooting the eagle to Service Special Agent Jim Person, saying that he thought he was shooting at a buzzard at the time. Both birds are protected by federal law. Young is set to begin serving his sentence July 27. He will also spend one year on supervised probation after his jail term. The case was investigated by the Service and the Missouri Department of Conservation. **7/98**

### **Prescribed Burning Completed at DeSoto National Wildlife Refuge**

*DeSoto National Wildlife Refuge*

The spring prescribed burning was completed at DeSoto and Boyer Chute Refuges. Of the 352 acres to be burned, only 35 acres were actually burned due to wet and windy weather. **7/98**

### **Missouri River Subject of Service Presentation to 'Wetlands 98' Managers**

*Large River Fisheries Coordination Office*

The impacts of channelization and development on Missouri River fisheries and the Service's proposed "passive" floodplain restoration program were the topics of a Service presentation to the Association of State Wetland Managers. Jerry Rasmussen, the Large River Fisheries coordinator made the presentation at the association's Wetlands 98 conference in St. Louis on September 20-25. The 25 minute slide presentation described the impacts of channelization and development on the Missouri River ecosystem, and described the "habitat bead" concept that is proposed for re-establishing the integrity of the river's ecosystem. The presentation also discussed the Big Muddy National Wildlife and Fish Refuge, and made suggestions for improving relations with floodplain farmers and landowners. The presentation was well received by those in attendance, including Ron Kucera, representing the Missouri Department of Natural Resources and the Governor's office. Kucera's presentation mentioned Missouri's proposal to recommend establishment of a "John C. Danforth National Fish and Wildlife Refuge" on the Middle Mississippi River (downstream from St. Louis,) that would mirror the "Big Muddy's" proposal for "passive" management of the floodplain ecosystem for fisheries and wildlife.

**9/98**

### **DeSoto's Eight-Year Deer Research Project Ends With Published Thesis**

*DeSoto National Wildlife Refuge*

DeSoto National Wildlife Refuge's white-tail deer research project was terminated after eight years with the publishing of Kurt VerCauteren's Doctoral thesis, "Dispersal, Home Range Fidelity and Vulnerability of White-Tailed Deer in the Missouri River Valley." This study aided the refuge in future management decisions. **9/98**

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